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Review of the genus *Pseudovelia* HOBERLANDT 1950 (Heteroptera: Veliidae) on the Malay Peninsula

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A b s t r a c t : Those species of the genus *Pseudovelia* are reviewed, which occur on the Malay Peninsula south of the Isthmus of Kra in Thailand. *Pseudovelia yangae* sp.n. is described as new from West Malaysia and southern Thailand. *Pseudovelia hypodonta* (LUNDBLAD 1936), originally described from Sumatra, Indonesia, is redescribed in both morphs and newly recorded from Singapore. A key is presented, which allows identification of both sexes of the five recorded species.

K e y w o r d s : Heteroptera, Veliidae, *Pseudovelia*, new species, description, diagnosis, key, Malay Peninsula, Thailand, Malaysia, Singapore, Indonesia.

Introduction

The last revision of the Oriental species of *Pseudovelia* HOBERLANDT 1950 by ANDERSEN (1983) contained nine species. However, *Pseudovelia* is a very diverse genus, especially in the Malay Archipelago (see NIESER 1995, SEHNAL 1999). Recently, ANDERSEN et al. (2002) keyed three species from western Malaysia and Singapore. Studies on material from the Malay Peninsula, mainly from the Zoological Reference Collection of the National University of Singapore, yielded two additional species, one of them new to science.

Material and methods

The examined material is deposited in the following institutions:

CUL Collection Wolfgang G. Ullrich, Lübeck, Germany (now in the Smithsonian Institution, Washington, U.S.A.)
 NHMW Natural History Museum, Vienna, Austria
 NRMS Naturhistoriska Riksmuseum, Swedish Museum of Natural History, Stockholm, Sweden
 ZMUC Zoological Museum, University of Copenhagen, Denmark
 ZRCS Zoological Reference Collection, National University of Singapore

Abbreviations for wing morphs:

apt. apterous

macr. macropterous

Measurements are taken from at least three males and three females of each morph and each locality or of all specimens, if fewer than three were available. In the diagnosis, some data are missing because they can not be measured on slide-mounted structures.

Taxonomy

Pseudovelia feuerborni (LUNDBLAD 1933)

Microvelia feuerborni LUNDBLAD 1933: 333-336.

Pseudovelia (s.str.) *feuerborni*: ANDERSEN 1983: 265-266.

Pseudovelia feuerborni: ANDERSEN et al. 2002: 232, 247, 248; HECHER 2005: 56-61.

Material examined: Indonesia: Holotype ♂ (macr.), Java, Lake Bedali, 21 Nov. 1928, leg. Thienemann (NRMS). Thailand: 4♂♂ (apt.), 4♂♂ (macr.), 8♀♀ (apt.), 1♀ (macr.), Chiang Mai, ca. 10 km E Samoeng, Samoeng river, N 018°51'40.2'', E 098°38'49.5'', 17 July 1997, leg. W.G. Ullrich (CUL, NHMW); 327♂♂ (apt.), 30♂♂ (macr.), 334♀♀ (apt.), 90♀♀ (macr.), Mae Hong Son, Mae Nam Cottage, Pai River among floating debris, N 019°19'59.0'', E 097°57'13.0'', 11 Aug. 1998, leg. W.G. Ullrich (CUL, NHMW). Malaysia: 5♂♂ (macr.), 1♀ (apt.), 3♀♀ (macr.), Trengganu, Brang River, 8 Oct. 1997, leg. K.L. Yeo, # YKL 917A (ZRCS, 1♂, 1♀ NHMW); 1♂ (macr.), 1♀ (macr.), Trengganu, Brang River, 21 Oct. 1998, leg. H.K. Lua & C.Y. Tuang, # LHK 401 (ZRCS); 1♂ (macr.), Pahang, Benom Mts., 15 km E Kampong Dong, 700 m, 3°53'N 102°01'E, 1 Apr. 1998, leg. Dembicky & Pacholatko (NHMW).

Diagnosis: Body length about 2.0 mm (apt. ♂), 2.2-2.4 mm (macr. ♂), 2.7-2.9 mm (apt. ♀), 2.7-3.0 mm (macr. ♀); length of tergites 1-7(8) to width of tergite 4 as 1 : 0.3 (apt. ♂), 1 : 0.2 (apt. ♀); pronotum length to pronotum width as 0.7-0.8 : 1 (apt. ♂, ♀), 0.8-0.9 : 1 (macr. ♂, ♀); length of antenna to body length as 0.5-0.6 : 1; relation of antennal segments 1-4 as 1.3-1.5 : 1 : 0.8-1.0 : 1.1-1.3, segment 1 > segment 4; width of second tergite to width of head as 0.9-1.0 : 1 (apt. ♂, ♀); length of metatarsus to metatibia as 0.5-0.6 : 1 (♂, ♀), length of first metatarsal segment to second as 0.7-0.8 : 1 (♂, ♀); length of grasping comb on male protibia to length of protibia as 0.5-0.6 : 1; vertex without patch of silvery hairs; eye not pilose; ventral lobe of head not produced caudad; first metatarsal segment of male with row of long hairs over entire length; segment 8 of male with ventral depression close to posterior margin of segment, divided into two parts by slender median ridge furnished with short hairs, with longer hairs along lateral margin of depression; proctiger and gonocoxa 1 of female entirely covered with short, dense, erect hairs.

Discussion: The macropterous morph of *P. feuerborni* was described from Sumatra by LUNDBLAD (1933) and redescribed by ANDERSEN (1983) from Java, Singapore, West Malaysia, and Thailand. The apterous morph was described by HECHER (2005). The Malaysian specimens differ from the descriptions by ANDERSEN (1983) and HECHER (2005), which were mainly based on specimens from Thailand, in some characters: (1) Row of long hairs on the first metatarsal segment of males usually with more hairs (5-7 vs. 4-5). (2) Apterous and macropterous females slightly larger. (3) Pronotum of macropterous specimens slightly wider. (4) Ratio of length/width of pronotum of apterous females larger (0.77 vs. 0.69-0.74). (5) Ratio of first and second metatarsomere of females smaller (0.68-0.69 vs. 0.73-0.82).

General distribution: Thailand, West Malaysia, Singapore, Java (ANDERSEN 1983). The record from the Philippines by ANDERSEN (1983) refers to an undescribed species (SEHNAL 1999).

***Pseudovelgia hypodonta* (LUNDBLAD, 1933) (Figs. 1-4)**

Microvelgia hypodonta LUNDBLAD 1933: 329-331.

Pseudovelgia (s.str.) *hypodonta*: ANDERSEN 1983: 264-265.

Material examined: **Indonesia:** Holotype ♂ (apt.), Sumatra, Wai Negri, Ranau, 22 Jan. 1929 (NRMS); 1 ♀ (apt.), Kundur Islands, Riau Island, Parit Gantung Sei Ungar, 13 Oct. 1998, leg. H.K. Lua & D. Wowor, # LHK 399 (ZRCS); 3 ♂ ♂ (apt.), 3 ♀ ♀ (apt.), Bintan Island, 47 km to Tanjung Pinang, 28 June 1995, leg. H.K. Lua & C.Y. Tuang, # LHK 268 (ZRCS, 1 ♂, 1 ♀ NHMW). **Singapore:** 1 ♂ (apt.), 2 ♀ ♀ (apt.), stream off Selatar Reservoir, 20 Feb. 1992, leg. C.M. Yang & K.L. Yeo, # YKL 779 (ZRCS); 3 ♂ ♂ (apt.), 9 ♀ ♀ (apt.), 1 ♀ (macr.), Lorong Banir, 16 June 1994, leg. K. Lim & al., # NS 160B (ZRCS, 1 ♂, 2 ♀ ♀ NHMW); 2 ♂ ♂ (macr.), Lorong Banir, 10 June 1994, leg. K. Lim & al., # NS 157B (ZRCS); 3 ♂ ♂ (apt.), 5 ♀ ♀ (apt.), Lorong Banir, 15 June 1995, leg. H.K. Lua & al., # NS 189A + 189B (ZRCS); 1 ♀ (macr.) Lorong Banir, 3 June 1994, leg. K. Lim & al., # NS 149A (ZRCS); 3 ♂ ♂ (apt.), 2 ♀ ♀ (apt.), Lorong Banir, 23 June 1994, leg. K.L. Yeo & al., # NS 167 (ZRCS, 1 ♂, 1 ♀ NHMW); 1 ♀ (apt.), Nee Soon swamp, permanent forest stream, 18 May 1993, leg. C.M. Yang & al., # NS 86 (ZRCS); 1 ♀ (apt.), Nee Soon swamp forest, 30 April 1992, leg. K.L. Yeo & B.K. Kung, # NS 001F (ZRCS).

Redescription of the apterous morph and description of the macropterous morph: **Size:** Length 2.10-2.27 mm (apt. ♂ ♂), 2.33-2.35 mm (macr. ♂ ♂), 2.25-2.50 mm (apt. ♀ ♀), 2.46-2.50 mm (macr. ♀ ♀), length of tergites 1-7(8) to width of tergite 4 as 0.26-0.30 : 1 (apt. ♂ ♂), 0.22-0.25 : 1 (apt. ♀ ♀), width across suture between metanotum and laterotergite 1: 0.72-0.80 mm (apt. ♂ ♂), 0.78-0.87 mm (apt. ♀ ♀), width of pronotum 0.67-0.77 mm (apt. ♂ ♂, ♀ ♀), 0.97 mm (macr. ♂ ♂), 0.97-1.00 mm (macr. ♀ ♀), width of head 0.50-0.63 mm (♂ ♂), 0.52-0.60 (♀ ♀).

Apterous male: Colour. Head light brown and dark brown or black; antenna brown. Pronotum light brown, with transverse stripe near anterior margin medially yellow and laterally light brown, median line of pronotum yellow; black, irregularly distributed pores or punctures on pronotum except on transverse stripe, and on tergite 1. Metanotum light brown. Legs light brown, with basal part of femora whitish and basal part of metatibia darker brown. Tergites and laterotergites light brown or dark reddish-brown, in some dark specimens lateral parts of laterotergites 2-7 slightly lighter; sutures between tergites and laterotergites broadly dark brown to black. Ventral surface of thorax and abdomen light brown to reddish-brown, sutures between sternites black.

Pilosity. Entire body surface covered with short, decumbent to suberect, silvery hairs. Erect hairs on head, antenna, and legs short, on anterior and lateral portions of pronotum, on metanotum, tergites, and laterotergites long and scattered, only on caudal margin of tergite 7 and of sternite 7 more dense; sternites 1-6 without erect hairs. Stout, silvery hairs forming stripes on vertex along margin of eyes, one small patch on base of vertex (in some specimens very indistinct), patches on lateral part of tergite 1, medio-caudal part of tergites 2, 3, 6, and 7, and covering caudal margin of laterotergite 1 and medio-caudal parts of laterotergites 3-5, some silvery hairs also on transverse stripe of pronotum. Metatarsal segment 1 with row of bristle-like hairs over entire length. Eyes naked except for two ocular setae.

Structural characters. Ventral lobe of head not produced caudad. Antenna 0.64-0.68

times as long as body, relative lengths of segments 1-4 as 1.4-1.6 : 1 : 1.1-1.2 : 1.3-1.5, segment 1 \geq segment 4. Pronotum 0.55-0.64 times as long as wide. Grasping comb on protibia 0.45-0.54 times as long as tibia; metatarsus (Fig. 3) 0.54-0.61 times as long as metatibia, first segment 1.00-1.16 times as long as segment 2 (except two males from Bintan Island: 0.89 : 1). Second tergite 0.87-0.96 times as wide as head. Laterotergites differently raised, causing variation of maximum width of body: across suture between metanotum and laterotergite 1 if strongly raised or across tergite 4 if laterotergites slightly raised.

Genital segments. Ventral depression of segment 8 with triangular table-like elevation on medial part, caudo-laterally with two tufts of bristles; caudal margin of depression with three tubercles: one laterally flattened and with comb of short bristles, two with tuft of longer bristles (Figs. 1, 2). Proctiger and pygophore covered with dense, short, erect hairs.

Macropterous male: Colour as in apterous male; head in some specimens darker brown with only basal part of vertex light brown. Wings brown, with two elongate white stripes at base.

Pilosity as in apterous male except for body parts covered by wings; long, erect hairs on media + cubitus and on first anal vein; additionally long, decumbent to suberect, silvery hairs on caudal part of pronotum and on sternites.

Structural characters and genital segments as in apterous male, but antenna 0.60-0.63 times as long as body; pronotum 0.97 times as long as wide; laterotergites strongly raised; wings slightly surpassing genital segments.

Apterous female: Colour and pilosity as in apterous male; long, erect hairs obviously dense on laterotergites 6 and 7.

Structural characters as in apterous male; antenna 0.56-0.63 times as long as body; protibia without grasping comb; metatarsus 0.48-0.56 times as long as metatibia, first segment 0.65-0.78 times as long as segment 2; second tergite 0.81-0.94 times as wide as head; laterotergites very strongly raised.

Genital segments. Proctiger covered with dense, short, erect hairs; gonocoxa 1 with scattered, suberect, short hairs. Structure of genital segments as shown in Figure 4.

Macropterous female: Colour and pilosity as in macropterous male; additionally whitish patches on posterior part of cell between media + cubitus and first anal vein, and on discal cell.

Structural characters and genital segments as in apterous female; antenna 0.56-0.57 times as long as body; pronotum 0.87-0.91 times as long as wide.

D i a g n o s i s: Body length 2.1-2.3 mm (apt. ♂), 2.3-2.4 mm (macr. ♂), 2.2-2.5 mm (apt. ♀), 2.5 mm (macr. ♀); length of tergites 1-7(8) to width of tergite 4 as 1 : 0.2-0.3 (apt. ♂, ♀); pronotum length to pronotum width as 0.5-0.6 : 1 (apt. ♂, ♀), 1.0 : 1 (macr. ♂), 0.9 : 1 (macr. ♀); length of antenna to body length as 0.6-0.7 : 1, relation of antennal segments 1-4 as 1.4-1.6 : 1 : 1.1-1.2 : 1.3-1.5, segment 1 \geq segment 4; width of second tergite to width of head as 0.9-1.0 : 1 (apt. ♂), 0.8-0.9 : 1 (apt. ♀); length of metatarsus to metatibia as 0.5-0.6 : 1 (♂, ♀), length of first metatarsal segment to second as 1.0-1.2 : 1 (except 2 males from Riau with 0.9 : 1), 0.6-0.8 : 1 (♀); length of grasping comb on male protibia to length of protibia as 0.5 : 1; vertex with patch of silvery hairs; eye not pilose; ventral lobe of head not produced caudad; first metatarsal segment of male (Fig. 3) with

row of bristle-like hairs over entire length; structure of male and female genital segments as shown in Figs. 1-2 and 4, respectively.

General distribution: Singapore, Riau Isl., Bintan Isl., Sumatra, Java (?).

***Pseudovelgia lundbladi* ANDERSEN 1983 (Figs. 5-8)**

Pseudovelgia (s.str.) *lundbladi* ANDERSEN 1983: 262-264.

Pseudovelgia lundbladi: ANDERSEN et al. 2002: 232, 247, 248.

Material examined: Malaysia: Holotype ♂ (apt.) and 1 paratype ♀ (apt.), Pahang, Cameron Highlands, 2000 m, 27 Nov. 1979, leg. P. Nielsen (ZMUC).

Diagnosis: Body length 2.6 (♂), 3.0 mm (♀); length of tergites 1-7(8) to width of tergite 4 as 1 : 0.3 (♂), 0.2 (♀); pronotum length to pronotum width as 0.6-0.7 : 1 (♂, ♀); length of antenna to body length as 0.6-0.7 : 1; relation of antennal segments 1-4 as 1.5-1.6 : 1 : 1.1-1.2 : 1.3-1.5, segment 1 > segment 4; width of second tergite to width of head as 0.9-1.0 : 1 (♂, ♀); length of metatarsus to metatibia as 0.5-0.6 : 1 (♂, ♀); length of first metatarsal segment to second as 0.7-0.8 : 1 (♂, ♀); length of grasping comb on male protibia to length of protibia as 0.6 : 1; vertex with patch of silvery hairs; eye not pilose; ventral lobe of head not produced caudad; first metatarsal segment of male (Fig. 7) with row of short, erect hairs over entire length; structure of male and female genital segments as shown in Figs. 5-6 and 8, respectively.

General distribution: Malaysia: Pahang; probably restricted to the mountainous zone of the Cameron Highlands.

***Pseudovelgia sexualis* (PAIVA 1917)**

Microvelia (*Kirkaldya*) *sexualis* PAIVA 1917: 77-79.

Microvelia sexualis: LUNDBLAD 1933: 308.

Microvelia crassipes LUNDBLAD 1933: 331-333 (syn. ANDERSEN 1983).

Pseudovelgia (s.str.) *sexualis*: ANDERSEN 1983: 256-259.

Pseudovelgia sexualis: ANDERSEN et al. 2002: 232, 247, 248.

Material examined: Indonesia: Holotype ♂ (apt.) of *M. crassipes*, Sumatra, Lake Toba, Balige, 2 Apr. 1929 (NRMS).

Diagnosis: Body length 2.0-2.2 mm (apt. ♂), 2.5 mm (macr. ♂), 2.5-2.8 mm (apt. ♀), 3.2 mm (macr. ♀); pronotum length to pronotum width as 0.6-0.7 : 1 (apt. ♂, ♀); length of antenna to body length as 0.5-0.6 : 1, relation of antennal segments 1-4 as 1.6 : 1 : 1.0 : 1.6; length of metatarsus to metatibia as 0.5-0.6 : 1 (♂, ♀), length of first metatarsal segment to second as 0.9 : 1 (♂), 0.7 : 1 (♀); length of grasping comb on male protibia to length of protibia as 0.6 : 1; vertex without patch of silvery hairs; eye densely pilose; ventral lobe of head not produced caudad; structure of male and female genital segments as figured by ANDERSEN (1983: figs. 13-17).

General distribution: Pakistan, India, Bangladesh, northern and southern Thailand, Sumatra (ANDERSEN 1983, HECHER 2005).

***Pseudovelgia yangae* sp.n. (Figs. 9-13)**

Type material: Malaysia: Holotype (apt. ♂): Trengganu, Brang River, 8 Oct. 1997, leg. K.L. Yeo, # YKL 917A (ZRCS); paratypes: 2♂♂ (macr.), 6♀♀ (macr.) from same locality as holotype (ZRCS, 1♂, 1♀ NHMW); 4♂♂ (macr.), 4♀♀ (macr.), Trengganu, Brang River, 21 Oct. 1998, leg. H.K. Lua & C.Y. Tuang, # LHK 401 (ZRCS, 1♂, 1♀ NHMW); 1♂ (macr.), Kelantan,

47 km N Gerik, unnamed stream, 13 Apr. 1994, leg. W.D. Shepard (NHMW); 1 ♂ (macr.), Selangor, 8 km S K. Kubu Bahru, Sengai Selangor, 11 Apr. 1994, leg. W.D. Shepard (NHMW); 1 ♀ (macr.), Johor, Panti, 31 Aug. 1990, leg. C.M. Yang, # YCM 27 B (ZRCS); Thailand: 1 ♂ (macr.), Narathiwat Prov., Ban Sac, 23 Oct. 1998, leg. H.K. Lua & C.Y. Tuang, # LHK 402 (ZRCS).

Description: **Size:** Length 2.63 mm (apt. ♂), 2.65-2.85 mm (macr. ♂♂), 2.97-3.03 mm (macr. ♀♀), length of tergites 1-7 to width of tergite 4 as 1 : 0.25 (apt. ♂), maximum width across suture between metanotum and laterotergite 1: 0.93 mm (apt. ♂), width of pronotum 0.90 mm (apt. ♂), 1.07-1.15 mm (macr. ♂♂), 1.17-1.23 mm (macr. ♀♀), width of head 0.62-0.68 mm (♂♂, ♀♀).

Apterous male: Colour. Head black; antenna dark brown. Pronotum dark brown, with short transverse stripe near anterior margin reddish brown; black, irregularly distributed pores on pronotum except on stripe. Metanotum dark brown to black. Legs dark brown, with basal part of femora yellow, change of colour abrupt. Tergites, laterotergite 1, and medial parts of laterotergites 2-7 dark brown, lateral parts slightly lighter. Ventral surface of thorax and abdomen black, stripe on lateral margin of sternites dark brown.

Pilosity. Entire body surface covered with short, decumbent, silvery or light brown hairs. Erect hairs on pronotum, metanotum, and laterotergite 1 short, on antenna, legs, tergites, and laterotergites 2-7 long, but on antenna and legs hirsute. Stout, silvery hairs forming stripes on vertex along margin of eyes, one small patch on base of vertex, and covering almost entire transverse stripe on pronotum, lateral portion of tergite 1, posterior part of tergites 2, 3, and 6, median patch on tergite 7, posterior margin of laterotergite 1, medial parts of laterotergites 3 and 4, and some silvery hairs also on medial part of laterotergite 6. Metatarsal segment 1 with row of long hairs over basal $\frac{1}{2}$ to $\frac{2}{3}$ of segment (Fig. 11). Eyes naked except for two ocular setae.

Structural characters. Ventral lobe of head not produced caudad. Antenna 0.68 times as long as body, relative lengths of segments 1-4 as 1.4 : 1 : 0.9 : 1.3 (Fig. 14). Pronotum 0.63 times as long as wide. Grasping comb on protibia 0.62 times as long as tibia; metatarsus 0.57 times as long as metatibia, first segment 0.94 times as long as segment 2. Second tergite 0.90 times as wide as head. Laterotergites slightly raised.

Genital segments. Ventral depression of segment 8 large and circular, along its margin two spines medio-laterally, two tubercles with a tuft of hairs caudo-laterally, and one laterally flattened tubercle with a comb of short bristles caudally (Figs. 9, 10). Proctiger and pygophore covered with dense, short, erect hairs.

Macropterous male: Colour as in apterous male. Forewing (Fig. 13) dark brown, with two elongate white stripes at base, light brown patches on posterior part of cell between media+cubitus and first anal vein, and on discal cell.

Pilosity as in apterous male except for body parts covered by wings; long, erect hairs on subcosta+radius and on media+cubitus.

Structural characters and genital segments as in apterous male; antenna 0.62-0.68 times as long as body, relative lengths of segments 1-4 as 1.4-1.6 : 1 : 0.9-1.1 : 1.3-1.5, segment 1 \geq segment 4; pronotum 0.81-0.88 times as long as wide; grasping comb on protibia 0.57-0.64 times as long as tibia; metatarsus (Fig. 11) 0.50-0.58 times as long as me-

tatibia, first segment 0.80-0.94 times as long as second; laterotergites slightly raised; wings not surpassing end of abdomen; four males dealate.

Genital segments as in apterous male.

Apterous female: unknown.

Macropterous female: Colour as in macropterous male.

Pilosity as in macropterous male; additionally silvery hairs on tergites 6 and 7, and on medial part of laterotergites 5 and 6.

Structural characters. Ventral lobe of head as in apterous male. Antenna 0.58-0.63 times as long as body, relative lengths of segments as in macropterous male. Pronotum 0.80-0.84 times as long as wide. Protibia without grasping comb; metatarsus as in macropterous male, first segment 0.72-0.78 times as long as second. Laterotergites and wings as in macropterous male. Six females dealate.

Genital segments. Tergite 8 extending over genital segments in genital segments, but without ending in stout tubercle. Proctiger and gonocoxa 1 covered with dense, short, erect hairs. Structure of genital segments as shown in Fig. 12.

D i a g n o s i s: Body length about 2.6 mm (apt. ♂), 2.7-2.9 mm (macr. ♂), 3.0 mm (macr. ♀); length of tergites 1-7(8) to width of tergite 4 as 1 : 0.2-0.3 (apt. ♂, ♀); pronotum length to pronotum width as 0.6 : 1 (apt. ♂), 0.8-0.9 : 1 (macr. ♂, ♀); length of antenna to body length as 0.6-0.7 : 1, relation of antennal segments 1-4 as 1.4-1.6 : 1 : 0.9-1.1 : 1.3-1.5, segment 1 \geq segment 4; width of second tergite to width of head as 0.9 : 1 (apt. ♂); length of metatarsus to metatibia as 0.5-0.6 : 1 (♂, ♀), length of first metatarsal segment to second as 0.8-0.9 : 1 (♂), 0.7-0.8 : 1 (♀); length of grasping comb on male protibia to length of protibia as 0.6 : 1; vertex with patch of silvery hairs; eye not pilose; ventral lobe of head not produced caudad; first metatarsal segment of male with row of long hairs over basal $\frac{1}{2}$ to $\frac{2}{3}$ of segment (Fig. 11); structure of male and female genital segments as shown in Figs. 9-10 and 12, respectively.

For distinction from other species distributed in the Malay Peninsula see the key. *Pseudovelgia yangae* sp.n. is closely related to *P. borneensis* ANDERSEN 1983, but males can be easily distinguished by the wide ventral depression on segment 8 (Fig. 9) and by the relatively short first metatarsal segment (Fig. 11).

E t y m o l o g y: This new species is named in honour of Mrs. Yang Chang Man (Zoological Reference Collection, Singapore), for her valuable contributions to the knowledge on southeast Asian Gerromorpha.

G e n e r a l d i s t r i b u t i o n: southern Thailand, West Malaysia.

***Pseudovelgia* sp.**

M a t e r i a l e x a m i n e d: 1♀ (apt.), Johor, Sg. Bong, 5 Apr 1992, leg. KL Yeo, # YKL 788 L (ZRCS), 2♀ (apt.), Johor, Endau, Rompin, Sungai Jasen, Tasak Air Biru ("Blue Lake"), 12 July 2001, leg. C.M. Yang & al., # YCM 0257 (ZRCS, NHMW).

D i s c u s s i o n: These three apterous females resemble specimens of *P. yangae* sp.n., but their tergite 8 is shorter than in the type material of this species. They may belong to an undescribed species, which must be confirmed by examination of males.

Key to the species

- 1 Eye densely pilose; ventral arolium leaf-shaped, flattened *P. sexualis*
 – Eye not pilose; ventral arolium bristle-like 2
- 2 Base of vertex without patch of silvery hairs; in apterous specimens pronotum more than 2/3 as long as wide; female much larger than male. – ♂: segment 8 ventrally with two shallow impressions separated by a low median carina, without tubercles or tufts of bristles *P. feuerborni*
 – Base of vertex with patch of silvery hairs; in apterous specimens pronotum less than 2/3 as long as wide; female only slightly larger than male. – ♂: segment 8 ventrally with complex structures, with tubercles and tufts of bristles (Figs. 1, 5, 9) 3
- 3 Third antennal segment less than 1.1 times as long as second (Fig. 14). – ♂: segment 8 ventrally with 5 tubercles or spines along margin of circular depression (Fig. 9). – ♀: tergite 8 subequally long with tergite 7, with hind margin more protruded (Fig. 12) *P. yangae* sp.n.
 – Third antennal segment at least 1.1 times as long as second. – ♂: segment 8 ventrally with different position and shape of tubercles (Figs. 1, 5). – ♀: tergite 8 distinctly shorter than tergite 7, with hind margin evenly convex 4
- 4 Femora with basal half whitish, apical half brown, colour abruptly changing. – ♂: first segment of metatarsus about as long or slightly longer than second (Fig. 3); grasping comb on protibia about half as long as protibia or shorter; segment 8 ventrally with a table-like elevation bearing two tufts of bristles, and with three tubercles each with tuft or comb of hairs (Figs. 1, 2). – ♀: body length about 2.5 mm or shorter *P. hypodonta*
 – Femora with base yellow and apex brown, colour more continuously changing. – ♂: first segment of metatarsus distinctly shorter than second (Fig. 7); grasping comb on protibia about 3/5 as long as protibia; segment 8 ventrally with one large, laterally flattened tubercle, a cup-shaped structure, and with two tubercles each with a tuft of hairs (Figs. 5, 6). – ♀: body length about 3 mm *P. lundbladi*

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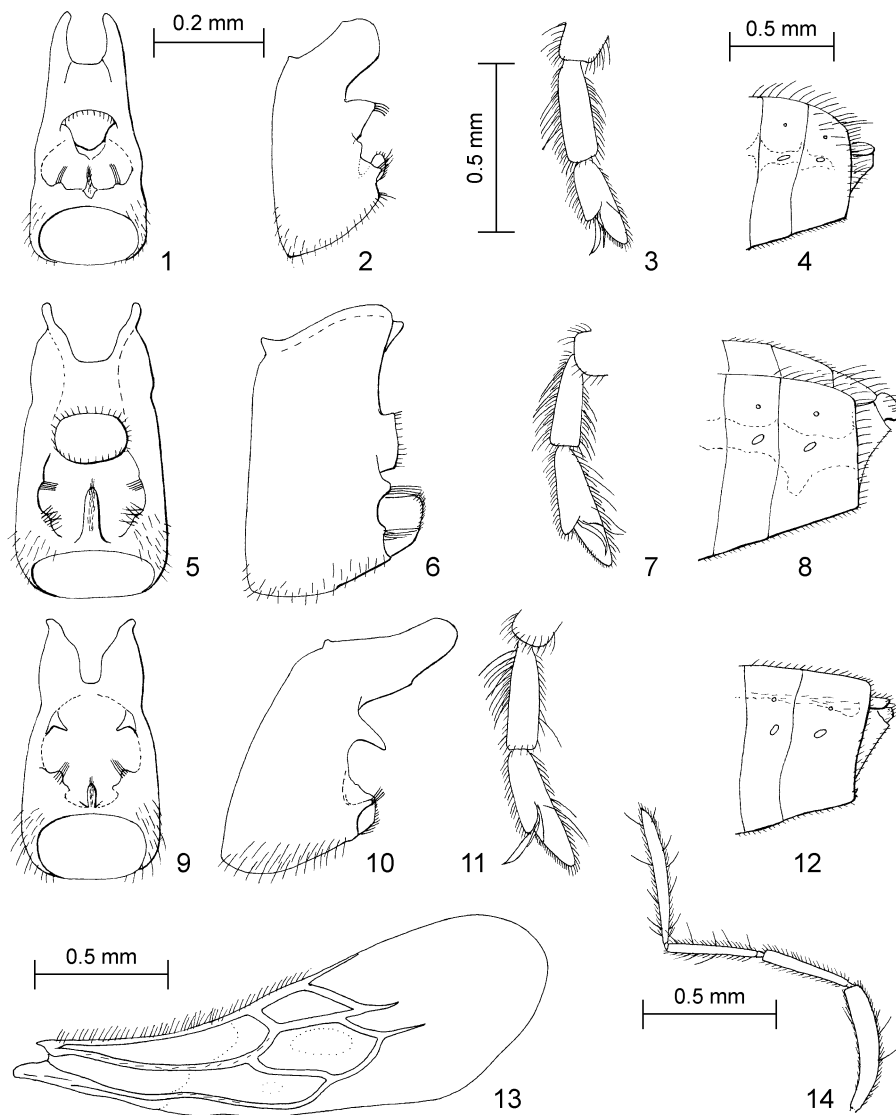
Zusammenfassung

Die Arten der Gattung *Pseudovelgia*, die auf der Malaysischen Halbinsel südlich des Isthmus von Kra vorkommen, werden revidiert. *Pseudovelgia yangae* sp.n. wird neu von West-Malaysien und Süd-Thailand beschrieben. Die ursprünglich aus Sumatra, Indonesien, beschriebene *Pseudovelgia hypodonta* (LUNDBLAD 1936) wird in beiden Morphen wiederbeschrieben und erstmals für Singapur gemeldet. Ein Bestimmungsschlüssel für beide Geschlechter erlaubt die Identifizierung aller fünf nachgewiesenen Arten.

References

- ANDERSEN N.M. (1983): The Old World Microveliinae (Hemiptera: Veliidae) I. The status of *Pseudovelgia* HOBERLANDT and *Perivelgia* POISSON, with a review of Oriental species. — *Entomologica scandinavica* **14**: 253-268.
- ANDERSEN N.M., YANG C.M. & H. ZETTEL (2002): Guide to the aquatic Heteroptera of Singapore and Peninsular Malaysia. – 2. Veliidae. — *The Raffles Bulletin of Zoology* **50** (1): 231-249.
- HECHER C. (2005): Notes on *Pseudovelgia* HOBERLANDT, 1950 (Insecta: Heteroptera: Veliidae) from Thailand, with description of a new species. — *Annalen des Naturhistorischen Museums in Wien* **106 B**: 55-65.
- LUNDBLAD O. (1933): Zur Kenntnis der aquatilen und semiaquatilen Hemipteren von Sumatra, Java und Bali. — *Archiv für Hydrobiologie*, Suppl. **12**: 1-195, 263-489, 21 plates.
- NIESER N. (1995): Nine new species of *Pseudovelgia* and a new *Xiphovelgia* (Heteroptera: Veliidae) from Sulawesi (Indonesia) and Mindanao (Philippines). Notes on the Malesian aquatic and semiaquatic bugs (Heteroptera), V. — *Tijdschrift voor Entomologie* **138**: 69-87.
- PAIVA C.A. (1917): Zoological results of a tour in the far east. Aquatic Hemiptera from the Talé Sap in Peninsular Siam. — *Memoirs of the Asiatic Society of Bengal* **6**: 77-82.
- SEHNAL C. (1999): Two new species of *Pseudovelgia* HOBERLANDT, 1950 (Insecta: Heteroptera: Veliidae) from Palawan and Busuanga, Philippines. — *Annalen des Naturhistorischen Museums in Wien* **101B**: 147-154.

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Figs 1-14: (1-4) *Pseudovelgia hypodonta*. (5-8) *Pseudovelgia lundbladi*. (9-14) *Pseudovelgia yangae* sp.n. (1, 5, 9) segment 8 of male, ventral. (2, 6, 10) segment 8 of male, lateral. (3, 7, 11) metatarsus of male. (4, 8, 12) end of abdomen of female, lateral. (13) forewing. (14) antenna of male. Fine, not diagnostic pilosity partly omitted. Homologous structures with identical scale as given for *P. hypodonta*.